FUJITSU

Case study
Yahoo Japan Corporation

» Using a next generation ICT infrastructure concept, the "Prefab" Data Centre, Yahoo Japan drastically reduced operational costs such as air conditioning and other facilities.«

Challenges
- Review high costs associated with current Data Centre facilities.
- Establish new construction and operational processes for large Data Centre environments.
- Drive new value from the Data Centre environment.

Effect
- Reduce the megawatt unit price by 60% and achieve an annual average PUE ratio of 1.044 (*).
- Established build and operation process for Prefabricated Data Centers.
- Established core technology and methodologies for robust ICT infrastructure to expand in the future.

Mr. N. Matsuya
Technical Director
Infrastructure
Engineering Dept.

Mr. T. Kimura
Manager
Site Operations

Ms. S. Tei
Purchasing Dept.

The customer

Yahoo Japan Corporation
Founded: Jan. 31, 1996
Registered Address: Minato-ku, Tokyo, Japan
Capital: 8,037M Yen
CEO: Mr. Manabu Miyasaka
Employees: 3,842 (Mar.2013)
Biz Lineup: Advertisement on Internet, e-Commerce, Membership Service, etc.
Homepage: http://www.yahoo.co.jp/

Background
Next Generation DC Concept targeted huge facility cost reductions
Yahoo Japan was established in 1996 and is now Japan's largest portal site. Yahoo started out as an internet search engine and directory site, where it gained overwhelming support from users during the early days of the Web. Now a leading internet organization, Yahoo continues to be at the forefront of Internet based services in Japan.

Yahoo Japan relies on Data Centers (DC) located across the country to maintain their highly reliable and stable business services. In 2004, in

order to extend the business Yahoo Japan began to decentralize their DCs, which were predominantly located in Tokyo. This process also provided the opportunity for Yahoo to drive down the facilities' operational costs.

Traditional DCs require a huge investment in top class infrastructure. However, Yahoo Japan was able to overcome this challenge by taking a next generation approach to DCs which could achieve high efficiency and reduce costs. In September 2011, Yahoo Japan commenced field trials for a modular style DC unit, referred to as a "Prefab" DC.

Mr. Norifumi Matsuya has been in charge of the Prefab DC project since its design phase. According to Mr. Matsuya, requirements for extreme reliability had the most impact on the costs of traditional DCs. "Within a traditional tiered DC, each facility is optimized to maintain reliability, supporting disaster prevention countermeasures and providing a redundant power supply. Yahoo Japan had to completely change this approach in order to achieve the business objectives."

The Prefab DC is a portable, single configuration unit that can accommodate approximately 400-500 servers. The servers can be installed according to demand growth, ensuring only the minimum number of servers are used. This system dramatically reduced facility costs and operational costs for air conditioning, electricity, disaster prevention countermeasures and more. In addition, the solution also promotes Green ICT which reduces their environmental footprint.

Mr. Matsuya said, "Traditional DCs are suitable for systems that handle confidential data. However many of Yahoo's systems only handle public information, and the requirements are more aligned to a Prefab DC. As the Prefabricated DC can be flexibly expanded in small

increments, Yahoo can provide guarantees in terms of service availability."

Implementation
PRIMERGY was selected to satisfy the Prefab DC requirements.
Following the confirmation of their basic design platform, Yahoo Japan began selection of a server for the Prefabricated DC. According to Mr. Kimura, as part of Yahoo Japan's Server Selection Policy, the servers for the Prefab DC were required to increase power efficiency and reduce electricity costs. Yahoo also wanted a server with a Backup Battery Unit (BBU), that allows them to discard the expensive UPS system, and to operate in a high temperature environment to minimize the air conditioning costs. After a comparison between a number of products, Yahoo Japan chose Fujitsu Server PRIMERGY RX200 S7, for its capability to satisfy these requirements to a high degree.

During the selection process, Yahoo identified that not only did PRIMERGY have the specification and performance to match Yahoo Japan's requirements, but Fujitsu also had the technology knowhow and support structure they expected from their server vender. Regarding the specification and performance, Mr. Kimura said "In addition to the cache design which drives energy savings and reduces our environmental footprint, the server's ability to guarantee operation in high temperature environments was a decisive factor." Mr Kimura indicated that the PRIMERGY server's high expandability as a 1U rack server was superior to others they evaluated.

The integrated Battery Backup Unit for PRIMERGY was jointly developed by Yahoo and FDK, a Fujitsu group company, while Fujitsu verified its operability with the server. Mr. Kimura said, "In 2010, embedding an integrated battery into a server was not a popular concept, and it was hard to find a suitable vendor. Eventually, we decided to develop our own solution with the help of Fujitsu."

System Overview
Installation for 200 Fujitsu Server PRIMERGY RX200 S7 was reduced with independent racking features
Construction of the DC, including the installation of 200 PRIMERGY RX200 S7 units, was competed in 2011. Ms. S. Tei, responsible for procurement and deployment of IT equipment at Yahoo said, "During this time, we put a variety of requests to Fujitsu, and each time they rapidly and accurately responded. This gave us a confidence in Fujitsu's support and reliability even after the installation. The highlight was the integrated Battery Backup Unit which successfully passed the test of our technical team and currently operates without any issues."

Mounting ICT equipment was also important in the Prefab DC construction. Yahoo insisted the equipment must be mounted to the racks efficiently. PRIMERGY's Drop in Rail and Quick Release Lever functions were a stand out advantage and reduced the installation time. "The servers needed to be rack mounted in the DC, and PRIMERGY RX200 S7 was the only server that satisfied this condition." Mr. Kimura. said.

The Outcome of Installation and Future Plans
The Prefabricated Data Center concept achieved a PUE ratio of 1.044 and a 60% reduction in the MW unit price.
The trial phase of the Prefab DC was completed and has now started playing a role in Yahoo Japan's day-to-day services. In 2013, the construction of a second unit was completed with several improvements such as the removal of various hot spots by repositioning parts of the equipment.

The Prefab DC project is already delivering quantitative improvements to Yahoo. According to Mr. Matsuya, the Prefab DC reduces 60% of electricity consumption compared with traditional DCs in terms of MW (Mega Watt) units, while the PUE (Power Usage Effectiveness) ratio has reduced to 1.044. "Our initial target was to bring the PUE ratio to less than 1.1, so we are very satisfied with this impressive result." Mr. Matsuya said. "Without FDK's BBU being mounted in the server, the Prefabricated DC project would not have been possible. The BBU and PRIMERGY have been key factors in achieving efficient power saving performance with a low failure rate." Mr. Kimura stated.

Mr. Matsuya and his team have been looking ahead to the future. "With agile and decentralized DCs, we have the capability to implement countermeasures against large-scale disasters. It is our responsibility to provide infrastructure that corresponds to the business's needs, and the evolution of the Prefab DCs will play a role in achieving this."

Products

Fujitsu Server PRIMERGY RX200 S7: A two-way rack mounted server with cutting edge technology, that saves power through optimized fan control.

Integrated Battery Backup Unit, jointly developed with Fujitsu and Fujitsu's group company, FDK: An Integrated Battery Backup Unit (BBU), which uses a Ni-MH battery (safe and robust against high temperature environments), effective during temporary blackouts and unexpected power outages. The BBU can replace expensive UPS systems and minimize power loss by conversion (AC to DC, DC to AC).

*PUE Ratio: Power Usage Effectiveness (PUE) is an energy efficiency measurement for DCs. The ratio is determined by the power consumption of the whole DC environment, divided by the power consumption of the ICT equipment.

*The contents of this Case Study are based on interviews conducted on July 3rd, 2013.